REMARKS

STATUS OF THE CLAIMS

Claims 1-7 and 10-16 remain in the application.

The Office rejected claims 11-13 and 15 under 35 USC 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The Office rejected claims 1-7, 10, 14, and 16 under USC 103(a) as being unpatentable over either one of the patents to *Ando* ('334, '054) in view of *Bernstein* ('980).

SUMMARY OF THE INVENTION

The present invention is directed to a micro acoustic spectrum analyzer for determining the frequency components of a fluctuating sound signal comprising a microphone to pick up the fluctuating sound signal and produce an alternating current electrical signal; at least one microfabricated resonator, each resonator having a different resonant frequency, that vibrate in response to the alternating current electrical signal; and at least one detector to detect the vibration of the at least one microfabricated resonator. The micro acoustic spectrum analyzer can further comprise a mixer to mix a reference signal with the alternating current electrical signal from the microphone to shift the frequency spectrum to a frequency range that is a better matched to the resonant frequencies of the at least one microfabricated resonator. The at least one microfabricated resonator can comprise an electromagnetic resonator.

SUMMARY OF THE ART

Ando et al., U.S. 6,012,334 and US 6,227,054, discloses a vibration wave detector, having a receiver for receiving vibration waves, such as sound waves; a resonant unit having a plurality of cantilever resonators each having such a length as to resonate at an individual predetermined frequency; a retaining rod for retaining the resonant unit; and a vibration intensity detector for detecting the vibration intensity, for each predetermined frequency of each of the resonators, by the vibration waves received by the receiver and propagated to the resonant unit by way of the retaining rod. When used as a sound wave

detector for speech recognition, the resonators can have resonant frequencies distributed in the mel scale or the Bark scale.

Bernstein, U.S. 6,455,980, discloses microfabricated plate wave resonator. The resonator portion of the plate wave resonator can be contacted to an intermediate portion at a number of contact points to stabilize the resonator on a single mode and prevent mode hopping. The micro fabricated plate wave resonator is suitable for electrostatic, piezoelectric, or ferroelectric actuation.

ARGUMENTS

AMENDED CLAIMS 11-13 and 15 ARE NOT INDEFINITE UNDER 35 U.S.C. § 112, SECOND PARAGRAPH

The Office rejected claims 11-13 and 15 under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Specifically, the Office pointed out that the instant application does not include claims 8 and 9. Therefore, the dependency of claims 11-13 and 15 was questioned. Applicants have amended claims 11-13 to correctly depend from claim 10. Applicants have amended claim 15 to correctly depend from claim 14. Accordingly, Applicants submit that this rejection is overcome and that amended claims 11-13 and 15 are now in condition for allowance.

CLAIMS 1-7, 10, 14, and 16, LIMITED TO AT LEAST ONE MICROFABRICATED RESONATOR THAT VIBRATES IN RESPONSE TO AN ALTERNATING CURRENT ELECTRICAL SIGNAL, ARE NOT MADE OBVIOUS BY *ANDO* IN VIEW OF *BERNSTEIN* UNDER 35 U.S.C. § 103(a)

The Office rejected Claims 1-7, 10, 14, and 16, asserting that the Applicants' micro acoustic spectrum analyzer is made obvious by *Ando's* acoustic analyzer structure in view of *Bernstein's* microfabricated resonator. To establish a *prima facie* case of obviousness, *inter alia*, the prior art references must teach or suggest all of the claim limitations. *See* MPEP 2143. Applicants submit that neither *Aldo* nor *Bernstein* teach or suggest the limitation of a microfabricated resonator that vibrates in response to an alternating current electrical signal.

With regards to claim 1, the Office asserted that *Ando's* ('334, '054) FIG. 3 shows a microphone (24), at least one resonator (25), and at least one detector (4). A microphone is a device that picks up an acoustic signal and produces an electrical signal proportional to the sound pressure. *See* Application, page 7, lines 5-13. *Ando's* plate-shaped receiver 24 is not a microphone. Rather, *Ando's* plate-shaped receiver 24 is vibrated by sound waves and transmits these vibrations mechanically to the resonators 25 via a retaining rod 22 and propagating portion 23. Therefore, Ando's plate-shaped receiver 24 does not produce an electrical signal proportional to the sound pressure. Accordingly, *Ando's* resonators 25 respond to mechanical vibrations, not to an alternating current electrical signal from a microphone. Indeed, *Ando's* entire sound wave detector, composed of a sensor main body 2 (comprising receiver 24, retaining rod 22, propagating portion 23, and resonators 25), electrodes 3, and detecting circuits 4, is a microphone. *See Ando*, col. 4, lines 5-10; col. 5, lines 44-57; and col. 6, lines 19-30.

Conversely, Applicants teach, and claim 1 recites, resonators that respond to an alternating current electrical signal. The alternating current electrical signal is produced by a microphone in response to a fluctuating sound signal. *See* Application, page 7, lines 5-23; page 9, lines 3-12; and claim 1.

With regards to claim 2, the Office referred to FIGs. 4-6 of *Ando*. FIG. 4 shows a detecting circuit 4 for converting the change in capacitance of a capacitor, composed of a tip end portion of each resonator 25 and each electrode 3 on the silicon substrate 1, to a voltage signal; integration of the voltage signal for a predetermined time period, and outputting the integrated result. *See Ando* ('054), col. 6, lines 31-59; and FIG. 4. FIG. 5 is a diagram showing the timing chart within the detecting circuit 4. *See Ando* ('054), col. 7, lines 23-29; and FIG. 5. FIG. 6 is a diagram showing the relationship of each detecting circuit 4 corresponding to the predetermined frequency. *See Ando* ('054), col. 7, line 64, through col. 8, line 9; and FIG. 6. None of these figures show a mixer to mix a reference signal with the alternating current electrical signal from the microphone, as recited in Applicants' claim 2. Indeed, because *Ando* directly drives his resonators mechanically, rather than first converting the sound to an alternating current electrical signal, *Ando* is unable to mix his mechanical vibrations with a carrier frequency to shift the sound

spectrum to a higher frequency range that is better matched to the natural vibration frequencies of microfabricated resonators. *See* Application, page 8, lines 9-27; and claim 2. As a result, *Ando's* device is limited to working with big resonators.

With regards to claim 10, *Bernstein* discloses a microfabricated plate wave resonator suitable for electrostatic, piezoelectric, or ferroelectric actuation. *See Bernstein*, col. 7, lines 27-41; col. 8, lines 19-32; and col. 9, lines 24-40. *Bernstein* does not teach or suggest the limitation of electromagnetic actuation, as recited in claim 10. *See* Application, page 9, lines 13-25; and claim 10. Furthermore, *Bernstein* does not teach or suggest a electromagnetic flexural plate wave resonator, a electromagnetic teeter-totter resonator, or a electromagnetic xylophone resonator, as recited in claims 11-13.

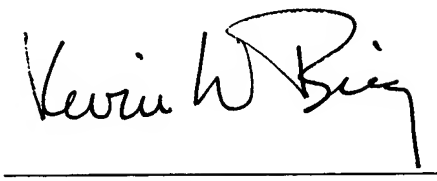
With regards to claim 14, in rejecting claims citing a complex reference, the Office must designate the particular part relied on in the cited reference as nearly as practicable and the pertinence of each reference must by clearly explained. *See* MPEP 707 and 37 CFR 1.104(c)(2). In rejecting claim 14, the Office merely asserts that "[d]ependent claims 14 and 16 are further disclosed in *Bernstein* and *Ando et al*, respectively." Applicants are unable to find a particular part in *Bernstein* that discloses a tunable resonator having a resonant frequency and a bandwidth that can be adjusted electrically, as recited in claim 14. *See* Application, page 14, line 1, through page 15, line 3; and claim 14. Furthermore, *Bernstein* does not teach or suggest a tunable resonator wherein the electrical adjustment comprises a capacitor-based circuit, as recited in claim 15.

Applicants submit that neither *Aldo* nor *Bernstein* teach or suggest the limitation of a microfabricated resonator that vibrates in response to an alternating current electrical signal and, therefore, the Office has not established a *prima facie* case of obviousness. Accordingly, Applicants submit that this rejection is overcome and that claim 1 is in condition for allowance. Furthermore, Applicants submit that claims 2-6, 10, 14, and 16, which depend from and further define claim 1, are likewise in condition for allowance. *See* MPEP 2143.03.

CONCLUSION

Applicants urge that the application is now in condition for allowance.

Respectfully submitted,



Kevin W. Bieg
Attorney for Applicants
Reg. No. 40,912
Ph: 505 284-4784
Sandia National Laboratories
P.O. Box 5800/MS 0161
Albuquerque, NM 87185-01

CERTIFICATION UNDER 37 CFR 1.8

I hereby certify that this correspondence and documents referred to herein were deposited with the United States Postal Service as first class mail addressed to: Commissioner for Patents, Alexandria, VA 22313-1450 on the date shown below.

Date: 5/11/04

By: Martha Trujillo